2020 ESIP Summer Meeting (July 14th-24th)
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Citizen Science Data and Information Quality

Wednesday, July 22 • 2:00 pm - 3:30 pm ET

More info & slides on Sched Session Page: https://sched.co/cluZ

Agenda

2:00-2:05 Technology and Welcome
2:05-2:15 Introduction and meeting goals (*Yaxing; Time-keeping: Rama*)
2:15-2:45 Presentations (*Moderator: Yaxing; Question-monitoring: Peng; Time-keeping: Rama*)
- 2:15-2:25 "The role of platforms in improving citizen science data quality and reuse - challenges and opportunities", Gregory Newman (Colorado State University; Citizen Science Association)
- 2:25-2:35 "Citizen Science Data Aggregation and Documentation: Lessons Learned (and Opportunities)", Clay Herbaugh / Anne Bowser (Wilson Center; Earth Challenge 2020)
- 2:35-2:45 Presentations Q&A (*Moderator: Peng; Time-keeping: Rama*)

2:45-3:25 Roadmap toward a rubric for the evaluation of quality levels (*Moderator: Yaxing; Question-monitoring: Peng; Time-keeping: David*)
- 2:45-3:10 Determine the data quality requirements from broad audience, including decision makers: Review of a draft survey to collect data quality requirements *(10 mins presentation by Yaxing + 15 mins Q/A*)
- 3:10-3:25 Discussion: toward the evaluation of quality levels for citizen science data

3:25-3:30 Summarize 3 Takeaways and Closing (*Moderator: Yaxing*)
Notes taking: Bob Downs (lead) + all co-chairs

Attendance

1. David Moroni, david.f.moroni@jpl.nasa.gov, PO.DAAC, JPL, California Institute of Technology, Pasadena, CA.
2. Yaxing Wei, weiy@ornl.gov, ORNL DAAC
3. Clay Herbaugh, State Department (Contractor)
4. Greg Newman, Colorado State University
5. Ge Peng, NCSU & CISESS/NCEI
6. Alexis Garretson, ESIP/ Jackson Laboratory
7. H. K. Ramapriyan (Rama), SSAI/NASA GSFC
8. Robert R. Downs, CIESIN, Columbia University, NASA SEDAC
9. Ken Kehoe, University of Oklahoma - Cooperative Institute for Mesoscale Meteorological Studies
10. Lisa Dallas, NASA GSFC, GLOBE DIS Task Manager

11. Chung-Lin Shie, UMBC/JCET, NASA/GSFC
12. Dave Jones, StormCenter Communications | GeoCollaborate, dave@stormcenter.com (co-chair ESIP Disaster Lifecycle Cluster)
13. Liz Harper, NOAA-NCEI
14. Ethan McMahon, mcmahon.ethan@epa.gov, US EPA
15. Sebastian Alvis, UW APL / eScience
16. Jessica Burnett jburnett@usgs.gov USGS Science Analytics and Synthesis
17. Debbie Roth, WHOI
18. Steve Young, EPA (retired) and Innovate! Inc
19. Carrie Pulliam carrie.p@uky.edu Kentucky Geological Survey
20. Catherine Cramer, NEREID and Woods Hole Institute catherine.cramer@gmail.com
21. Adam Sapp, GCE LTER, asapp@uga.edu
22. Julia Collins, NSIDC/CU/CIRES, collinsj@nsidc.org
23. Crista Straub / USGS / cstraub@usgs.gov
24. Marseille Bunk/NASA ESDIS/marseille.bunk@nasa.gov
25. Karen Moe, NASA GSFC Retired, karen.moe@earthlink.net, ESIP Disasters Lifecycle Cluster co-chair and Air Quality Cluster

QGoals of this Session

- share experiences, practices, and state-of-the-art of research on citizen science data quality,
- Identify opportunities to improve capture, documentation, and use of quality information for citizen science data.
- develop an approach to determining the data quality requirements for policy makers, community leaders, and other non-academic scientists to use data products in decision-making
- develop a roadmap toward a rubric for the evaluation of quality levels attained by citizen science data products and services

Presentation Questions (*10 mins, Moderator: Peng; Time-keeping: Rama*)

- Enter your questions for the presenters here (@Who from Who)
- @Greg from Dave Jones: How do you provide access to the observations and data for other GIS platforms? Such as web services? Feature services? Do you have a way to test data access and sharing? Thanks.
    - Greg: Via Web services usually although we are exploring more ways to do this effectively… via RESTful APIs...
- @Greg: Does the Citizen Science Association anticipate sharing the platforms with other CS research efforts?
    - Greg - The platform is not a CSA platform, but we can share it. It is an API to facilitate interoperability.

    - Clay - APIs: You can pull in your own tools or use our tools.
- @Greg from Karen Moe: Are there any groups organizing around COTS air quality monitors like Purple Air PM2.5 monitors that can aggregate the processed Purple Air data from their website into a local subset of sensors?
    - @Karen from Greg - great question. I am not familiar with Purple Air specifically but am aware of many PM20 monitors that send data to a backend. Our experience has been identifying a need for system and backend interoperability... hence my interest in standards...

- For Greg and Clay: How do you ensure the privacy of volunteers while facilitating transparency?
    - Answer from Clay: We don't collect personal information from volunteers.
    - Answer from Greg: We only collect standard registration information, but regulate a variety of governing structures on PII as determined and specified by the individual volunteer in registration preferences.

- @Greg and/or all the presenters from Chung-Lin, do you think or feel comfortable, or confident and ready to issue DOI's to your CS datasets (assuming not yet)?
  Having been working with digital library regarding this objective to deposit data through web services API as immutable datasets. CS data are typically consistently being updated.
- @Greg from Yaxing: Can the platform be generalized to address the needs from different CS projects?
  Down the road
- @Clay from Yaxing: What challenges did you see in harmonizing data from different sources into the "interoperable" format? How to consolidate different vocabularies?
- We had multiple challenges:
    - Selecting an interoperable data standard that could meet the needs of data across disparate research questions and how to extend data standards to meet our needs
    - Working with data sets that are missing data that are key to good interoperability results to ensure quality data outcomes. This started with key fields and then evolved to ensuring common meta-data is captured in like format.
- @Clay from Karen Moe: On the need for controlled vocabularies, any recommendations for developing or promoting vocabularies in selected domains?
    - This is a bit challenging for me to answer as a technologist, I believe our participation in associations that empower Citizen Science activities such as this one help us get the word out. Ultimately, as a technologist, we would love to see a CS standard that defines terms for CS projects that

could be used for interoperability. Anne's work has gone a long way to help make this happen.

- @Clay from Dave Jones: Since you use AGOL do you have links to the REST service such as Feature services? Thanks. Sorry this was answered already.
- Dave, we have not released our Feature Services publicly yet. If you provide your email, I can let you know when they are available. (herbaughc@state.gov)
- From Lisa Dallas: Do you allow participation of children and how do you handle COPPA?
- @Clay: Given that the Earth Challenge (EC) platform collected only 4,000 data points, as reported by the partner projects (and versus the promised 1 Billion), what do you see as the challenges the project faced that could be overcome in the coming year?
    - We are at 126M+ data points to date. Definitely we were impacted by COVID in terms of participation; however, we are seeing continually increasing interaction by users across the globe.
    - Please do keep in mind that there was a conscious effort to not have full promotional activities around the app due to concerns with social distancing.
- @Clay: The partner project PIs are reporting that the EC asked for their project data, separate from the data collected through the EC challenge app/platform, to incorporate it into the EC. What data was actually collected through the EC app?
    - Data was collected from data sources aligned to the six research questions such as the three in our presentation for Plastics.
- @Clay: Given that the Earth Challenge data was collected through numerous citizen science projects who were partners to the Earth Challenge, how is ownership of the data handled between the EC, the project PIs, and the citizen scientists who contributed the data?
    - The list of partners can be found: https://earthchallenge2020.earthday.org/pages/partners
    - All project PIs are contacted and we work with them to ensure that we are licensed to use their data and that they understand the interoperability process.
- @CLay: The Earth Challenge is tied to the Earth Day Network, which is a fundraising organization. Other agencies like NASA and NOAA decided not to participate in the EC because of this issue. How does the State Department address this concern?
    - First, let me state that I am not a federal employee, I am a federal contractor, so I am not privy to all aspects of decisions made by the government.
    - I also cannot speak to the particular reasons that NOAA and NASA are not currently participating; however, we are working with other federal agencies and branches of the government that have expressed an interest to be involved with the project.

    - It is my understanding that the U.S. State Department treated the Earth Day Network as any vetted partner. The Department ran a background check on EDN. Their process, as I understand it, includes checking ethics and conflict of interest among other organizational vetting. From what I understand, EDN passed as an eligible partner to work with the Department.
- @Clay: The Earth Challenge replicated the functionality of several already existing citizen science project apps and platforms. What was the reasoning for approaching it this way, rather than utilizing existing platforms? Several partner project PIs have expressed concern about this replication.
    - I'm not aware of another tool that combines mobile interaction, data visualization and multi-tier interaction to include GPU-based analytics. I would be curious to hear more about other projects that are doing the same. Our goal is to contribute to the CS community, not repeat other solutions.

Comments/Questions for the Draft Survey (*15 mins, Moderator: Bob; Time-keeping: David*)

- **Seeding questions**
    - Are there previous studies and surveys that we can learn/build from and collaborate with?
    - Do these questions and the pick lists address our research questions?
    - Are there other questions we should include?
    - What audience should we target?
    - Any other concerns/thoughts about the survey?
- Comment from Steve Young: Agree that striving to make CS data useful for decision-making is important. But we also should think about how to make CS data more useful for "doing science" upstream from supporting decision-making. Need a simple logic model Better CS data --> new and better science --> supports better decisions
    - Different groups of decision makers are making different decisions.
    - From Eileen Shay: Just want to echo Steve Young's point. Engaging teachers and their students in CS programs can be exciting and lead some to science as a field. Worked in the Pacific Region for SPARSE -- a rainfall measurements program with teachers with the students work captured in professional journal articles and conference presentations. It REALLY excited them to be part of science.
        - From Yaxing: appreciate @Eileen's comment - aspect of bringing users into this survey. Be able to encourage students and future researchers.
    - From Greg Newman: @Eileen yes indeed... STEM pathway for youth is a huge outcome itself…; Be mindful of the goals of using CS data. Survey may allow us to get some insightful information.

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- From Jessica Burnett: I have to leave before end of session, so here are my comments on the survey and its contents:
    1. Have or do you plan to consult an online survey expert to design and administer? If not, I have at least one colleague who I suspect might be interested in helping (although I see Dr Straub is here so…..)
        a. Experts like Bob from IQC can help. Bob: additional experts can also help with the quality of the survey.
    2. Are the currently listed "target audiences" (eg ESIP cluster members) going to be representative of policy or decision makers? Will responses from this audience help answer the RQs?
        a. Yaxing: very good questions. Not many IQC members are policy- or decision makers - data analysis. We also want to get feedback on other audiences we should target.
        b. Rama: IQC members would not necessarily be representative of decision-makers but they may be quite rooted into.
    3. Careful with the term "decision" or "decision makers", some have very different views.
        a. Greg: a great point to be careful about. Who are stakeholders? Unpack more?
    4. Comments on specific questions
        a. Q4 is a very vague question
        b. Q10: some folks may not be aware that the data they use are citizen science.
    5. There is no question about what types or kinds of decisions the respondent makes. If we allow them to provide X different types of decisions, you could potentially ask the following questions for *each* decision type: what products do you use; what is the minimum quality of information/data required to make that decision.
- IRB needs… Do you plan to obtain Institutional Review Board (IRB) approval prior to conducting the survey in accordance with ethical norms of science?
    - Bob: agree - we need to work with IRB to receive the approval prior.
    -
- From Chung-Lin. First thanks to Grey for the great answer to my earlier DOI question. Here's the question/comment on the survey. I would probably like to ask you/CS what would be the basic and most important components that must and need to be considered or required to maintain and provide the CS datasets to communitie addressing/meeting the quality concern at its minimum.
- From Steve Young: Also think about high-level policy decisions and potential CS role for them, and in contrast more local management decisions that may benefit from CS inputs for example species presence/absence, timing of breeding/migration, evacuations in face of coming weather disaster, etc

- From Eileen Shay to Steve and Greg: happy to contribute, Steve and Greg echo Steve again.
- From Ethan McMahon: after the initial questions about the person, I would then ask about the type of decision or problem the person is trying to address. Potential responses could be: raise public awareness, respond to an environmental problem that the community has concerns about, contribute to a research project, get elected officials or agencies to take action against a party that may be damaging public health or the environment. See this 2016 report by EPA's National Advisory Council for Environmental Policy and Technology: Environmental Protection Belongs to the Public, A Vision for Citizen Science at EPA. Page 5 shows a spectrum of citizen science data use. A 2018 report, Information to Action—Strengthening EPA Citizen Science Partnerships for Environmental Protection, provides more information about potential agency actions.

Discussion and Open Questions (*15 mins, Moderator: Peng; Time-keeping: David*)

- **Seeding questions**
  - What challenges do you see with pursuing a rubric for evaluation of quality levels for citizen science data?
    - Greg: people struggle with being graded … people have invested a significant amount of effort. We might be facing challenges with demotivation of their voluntary participation.
    - Peng: provide guidance to help data producers/practitioners to improve the quality of the data. Providing quality info helps data users to better use of their data. By doing so, it also improves the maturity of the data.
    - David: A parallel analogy is with respect to remote sensing data. Data from CS is analogous to raw telemetry data. The rubrics are targeted to higher order products that are aggregations of collected CS data.
    - Yaxing - EC2020 presented by Clay harmonzies data from multiple projects. That would be an aggregated product. Would a rubric for this be useful?
    - Clay: such rubric can be very useful as long as enough documents are available. Will be
  - What opportunities are there?
  - Is this achievable at this stage? What issues do we need to address first to achieve this objective?
  - What makes citizen science data unique/different from data captured/produced through traditional research/measurement mechanisms?
    - Clay: For underserved communities, no money or fund to capture research-level air quality information. So it would be useful to provide data quality information there.
  - How can we benefit from those existing maturity matrices?

        - Peng: By exploring the existing MM, we can leverage some of relevant best practices for the rubric to be developed.
    - Any other comments/thoughts about this objective?
- Enter your comments/questions here
-

3 Takeaways

- Platforms have an important role for helping with CS workflow and increasing confidence in CS data products. The more we can include documentation of quality in all stages of CS projects the better.
- The draft survey is useful to capture data quality requirements from different types of users; target at not just downstream decision makers, but also those in the middle that could improve use of CS data in science that generates useful end products
- Rubrics for the evaluation of quality levels attained by citizen science data products and services are useful and should be pursued, though there are challenges that need continued discussion.

General Notes: (*Notes taking: Bob Downs (lead) + all co-chairs*)

- **Very many questions and comments were offered by session participants regarding Citizen Science practices and regarding the design and conduct of the planned survey.**
    - **Important distinctions were made between the different kinds of practitioners and decision makers from which the survey would solicit responses, requiring careful consideration about the target respondents, implications for improving research on citizen science, and the development of the research questions and the survey questions.**
    - **Specific suggestions also were offered for improving the draft survey questions to ensure understanding and consistent interpretation by survey respondents.**
- **There is also much interest in the development of a rubric for evaluation of quality levels of citizen science data**
    - **In particular, the importance of providing guidance for improving the quality of citizen science data was emphasized as well as the importance of providing documentation for citizen science data.**
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Resources

- **European Citizen Science Association: https://ecsa.citizen-science.net**
- **Australian Citizen Science Association: https://citizenscience.org.au**

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- **Citizen Science Association: https://www.citizenscience.org**
- **SciStarter Citizen Science Projects Catalog: https://Scistarter.com**
- **US Federal Government Citizen Science Community of Practice, Toolkit, and Catalog: https://Citizenscience.gov**
- **Center for Earth Observation & Citizen Science: https://iiasa.ac.at/web/home/research/researchPrograms/EcosystemsServicesandManagement/EOS.en.htmGroup on Earth Observations GEO-CITSCI: https://www.earthobservations.org/documents/gwp20_22/GEO-CITSCI.pdf**
- **Citizen science Earth Observation Lab: https://cseol.eu**
- **GEO-WIKI Earth Observation and Citizen Science: https://www.geo-wiki.org/pages/about**
- **Group on Earth Observations GEO-CITSCI: https://www.earthobservations.org/documents/gwp20_22/GEO-CITSCI.pdf**
- **The Zooniverse Citizen Science Projects Platform: https://Zooinverse.org**
- **Special Issue: Citizen science and Earth Observation: https://www.mdpi.com/journal/remotesensing/special_issues/earth_observation**
- **Citizen Science project evaluation guide: https://www.citizenscience.org/wp-content/uploads/2018/11/USERS-GUIDE_linked.pdf**
- **Other supplementary materials**
    - NASA Earth Science Data Systems Citizen Science Data Working Group White Paper, Version 1.0 – 24 April 2020, Available at https://earthdata.nasa.gov/files/CSDWG-White-Paper.pdf
    - ESIP Information Quality Cluster

At session start:

- **Welcome**
    - Orient attendees to tech (Zoom and QiqoChat)
    - Invite attendees to share their name/affiliation/location in the Zoom chat
    - Invite others to take notes in this document (if desired)
    - Assign any other roles needed
- **Community Participation Guidelines Reminder**
    - By participating in this session, you agree to adhere to the ESIP Community Participation Guidelines
    - Report an Issue: https://www.integritycounts.ca/org/esip
- **Goals of this Session**
    - share experiences, practices, and state-of-the-art of research on citizen science data quality,
    - identify opportunities to improve and document the quality of citizen science data

- develop an approach to determining the data quality requirements for policy makers, community leaders, and other non-academic scientists to use data products in decision-making
- develop a roadmap toward a rubric for the evaluation of quality levels attained by citizen science data products and services
- foster a collaborative interchange of technical information intended to help advance the assessment, improvement, capture, conveyance, and use of quality information associated with citizen science data.
- The last few minutes should be reserved for recording 3 key takeaways from the session in the Takeaways Document.

Before session close:

- **Capture 3 Takeaways & Shared insights**
  - What did we discover?
  - How can we help each other?
  - What knowledge and resources do we have to share?
  - Important remaining questions?

- **Closing circle**
  - Share any reminders
  - Shout-outs & thanks
  - Requests for peer assists

5 ways to stay involved with ESIP

- Join the conversations on our ESIPFed Slack Channel and say hello on #general.
- Keep up with the latest from in and around ESIP by signing up for the ESIP Monday Update or the mailing list of this group.
- Share your feedback, questions, and suggestions with our Twitter community @esipfed and #esipfed.
- Hop on an ESIP Telecon that interests you - no need to RSVP!
- At this meeting, pitch an idea for FUNding Friday and check out the Research Showcase.

Feedback

Please take a moment to share your thoughts on this session in Sched by going to the Sched session page linked at the top of this document.

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Paste in Zoom Chat notes that you would like to save here

From yaxingwei to Everyone: 01:59 PM
Meeting Notes:
https://docs.google.com/document/d/1FfcpB4MNoDlMosd9g527zrQcow7eCCgzHELKdm_Qx5Q/edit
From Ge Peng to Everyone: 02:00 PM
Nice to have you all here. Please enter your questions in the Meeting Notes or the Zoom's Chat window.
From Me to Everyone: 02:09 PM
The link to the notes directly:
https://docs.google.com/document/d/1FfcpB4MNoDlMosd9g527zrQcow7eCCgzHELKdm_Qx5Q/edit?usp=sharing
From Ramapriyan to Everyone: 02:10 PM
Meeting Notes (QiQoChat link):
https://docs.google.com/document/d/1FfcpB4MNoDlMosd9g527zrQcow7eCCgzHELKdm_Qx5Q/edit

From Dave Jones to Everyone: 02:23 PM
@Greg How do you provide access to the observations and data for other GIS platforms? Such as web services? Feature services? Do you have a way to test dat access and sharing? Thanks.
From Greg Newman to Everyone: 02:26 PM
Via Web services usually although we are exploring more ways to do this effectively...
From Karen Moe (NASA Retired) to Everyone: 02:27 PM
@Greg Are there any groups organizing around COTS air quality monitors like Purple Air PM2.5 monitors that can aggregate the processed Purple Air data from their website into a local subset of sensors?
From Ramapriyan to Everyone: 02:29 PM
All - if you have not entered your name in the Google Doc at
https://docs.google.com/document/d/1FfcpB4MNoDlMosd9g527zrQcow7eCCgzHELKdm_Qx5Q/edit
we would appreciate your doing so. -- Thanks.
From Greg Newman to Everyone: 02:29 PM
@Karen - great question. I am not familiar with Purple Air specifically but am aware of many PM20 monitors that send data to a backend. Our experience has been identifying a need for system and backedn interoperability... hence my interest in standards...
From Greg Newman to Everyone: 02:36 PM
Great talk @Clay!
From Karen Moe (NASA Retired) to Everyone: 02:38 PM

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@Clay on the need for controlled vocabularies, any recommendations for developing or promoting vocabularies in selected domains?
From Dave Jones to Everyone: 02:42 PM
@Clay - Since you use AGOL do you have links to the REST service such as Feature services? Thanks.

Sorry this was answered already.
From Lisa Dallas to Everyone: 02:42 PM
Do you allow participation of children and how do you handle COPPA?
From Steve Young to Everyone: 02:55 PM
Agree that striving to make CS data useful for decision-making is important. But we also should think about how to make CS data more useful for "doing science" upstream from supporting decision-making.
Need a simple logic model Better CS data --> new and better science --> supports better decisions
From Greg Newman to Everyone: 02:55 PM
@Lisa - children usually participate under the auspices of a teacher account in my experience thus far...
@Steve - yes a science use case for sure...
From EileenShea to Everyone: 02:55 PM
just want to echo Steve Young's point. Engaging teachers and their students in CS programs can be exciting and lead some to science as a field. Worked in the Pacific Region for SPARSE -- a rainfall measurements program with teachers with the students work captured in professional journal articles and conference presentations. It REALLY excited them to be part of science.
From Greg Newman to Everyone: 02:56 PM
@Eileen yes indeed... STEM pathway for youth is a huge outcome itself...
From Steve Young to Everyone: 03:04 PM
Also think about high-level policy decisions and potential CS role for them, and in contrast more local management decisions that may benefit from CS inputs for example species presence/absence, timing of breeding/migration, evacuations in face of coming weather disaster, etc
From EileenShea to Everyone: 03:05 PM
happy to contribute, Steve and Greg
echo Steve again
From C4 Clay Herbaugh to Everyone: 03:07 PM
@steve @Eileen - We could not agree more. We look for opportunities to engage such as TedEd to get students excited about CS while also being an excellent learning opportunity for us
From EileenShea to Everyone: 03:09 PM
Very well defined, Greg. it's the use/applications that help identify who will be using it. Been the focus of my own career in climate information services.

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From C4 Clay Herbaugh to Everyone: 03:09 PM
@Greg Newman - Great presentation, I really enjoyed it!
From Greg Newman to Everyone: 03:10 PM
Thanks @Eileen - would love to chat more - gregory.newman@colostate.edu
@Clay - really enjoyed your presentation as well...
From EileenShea to Everyone: 03:11 PM
Happy to talk further. elmshawaii@gmail.com
@Clay -- very good and thoughtful presentation
From Steve Young to Everyone: 03:17 PM
Quality can be thought of as fitness for use (and whether a potential user is able to evaluate fitness). Could play with having a spectrum from "reconnaissance level" observation that has not been reviewed through an iNaturalist-style "research grade" designation on to some sort of "Validated" level that reflects a higher level of review.
From C4 Clay Herbaugh to Everyone: 03:19 PM
@EileenShea - Thank you. Please feel free to reach out to me (herbaughc@state.gov) or Anne (anne.bowser@wilson.org).
From EileenShea to Everyone: 03:19 PM
will do. thanks
good idea, David
From Chung-Lin Shie to Everyone: 03:22 PM
Thanks @Greg for an excellent presentation. Your kind answer to my DOI question is reasonable and practical. Indeed, CS being so dynamic does pose a concern for DOI assignment. Further to ensure its data quality should be the key. Meanwhile, to issue various versions of DOI may be an alternative if you/we do like to go this DOI route. Thanks again!
From EileenShea to Everyone: 03:25 PM
@Clay -- extremely good point your measuring stations; sometimes there are Foundation grant opportunities for adding stations in/for underserved communities. I'm most familiar weather observing platforms but I know there are folks out there looking at air quality concerns.
From Karen Moe (NASA Retired) to Everyone: 03:26 PM
Good presentations and an important topic. Thank you
From David Moroni to Everyone: 03:28 PM
I have to step away. Nice job Yaxing, and kudos to all of the presenters. It's great to see the enthusiasm being displayed on CS data.
From C4 Clay Herbaugh to Everyone: 03:30 PM
@Eileen - Terrific point. The more we can excite underserved communities to take interest in CS data, the more we can not only normalize; but, get them excited to apply for grants
From EileenShea to Everyone: 03:30 PM
Thanks to all the presenters!
From Greg Newman to Everyone: 03:31 PM
I second the comments re: marginalized/underserved audiences... and thanks to Yaxing!
From EileenShea to Everyone: 03:31 PM

agree Clay! it can be very exciting